

CLAIMS

What is claimed is:

1. A DNA sequence encoding violaxanthin de-epoxidase wherein said DNA is joined to a heterologous nucleic acid sequence and said DNA has at least about 70% homology at the DNA level to the sequences shown in Fig. 1 or Fig. 2 or Fig. 3.

2. A DNA sequence encoding violaxanthin de-epoxidase wherein said DNA is joined to a heterologous nucleic acid sequence and said DNA has at least about 70% homology at the DNA level to the amino acids found at the N-terminus of the plant vde of Fig. 1 or Fig. 2 or Fig. 3.

3. A DNA sequence encoding an amino acid sequence comprising VDALKTCACLLK joined to a heterologous nucleic acid sequence.

4. A method of modifying vde levels in a host cell comprising growing a host cell having a vde modifying construct in its genome, wherein said vde modifying construct comprises, in the order of transcription, a plant transcription initiation region, a plant vde encoding sequence, and a transcriptional termination region, and wherein said construct contains at least one sequence heterologous to the other sequences of said construct or to said plant.

5. The method of Claim 4 wherein said construct further comprises a translation initiation region and a plastid translocation sequence and wherein said vde gene is in a sense orientation, whereby vde is overexpressed in said host cell.

6. The method of Claim 4 wherein said host cell is a plastid containing plant cell.

7. The method of Claim 6 wherein said vde gene is in an antisense orientation and vde is underexpressed in said plant.

8. A method of modifying sensitivity to light comprising growing a plant having a light modifying construct in its genome wherein said light modifying construct comprises, in the order of transcription, a plant transcription initiation region, a plant vde encoding sequence and a transcriptional termination region and wherein said construct contains at least one sequence heterologous to the other sequences of said construct or said plant.

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9. A method of increasing zeaxanthin levels in a plant comprising growing a plant having a zeaxanthin modifying construct in its genome, wherein said zeaxanthin modifying construct comprises, in the order of transcription, a plant transcription initiation region, a plant vde encoding sequence and a transcriptional termination region and wherein said construct contains at least one sequence heterologous to the other sequences of said construct or said plant.

10. A plant, plant cell or other plant part comprising the DNA sequence of any one of Claims 1, 2 and 3.

11. A plant, plant cell or other plant part produced by the method of any one of Claims 4, 5, 6, 7, 8, and 9.

12. The method of Claim 8 wherein said plant vde encoding sequence expresses violaxanthin de-epoxidase (vde), whereby vde activity is increased and increased zeaxanthin and antheraxanthin production protects said plant against high light.

13. The method of Claim 8 wherein said plant vde encoding sequence is antisense with respect to said transcription intiation and termination regions, whereby zeaxanthin and antheraxanthin production is decreased and the sensitivity of said plant to light is increased.

14. A plant according to Claim 11 wherein flowering of said plant is delayed as compared to flowering in a control plant not produced by said method.

15. A plant according to Claim 11 wherein flowers of said plant are larger as compared to flowers of a control plant not produced by said method.

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